

School Environment Safety Guidelines

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Abstract

In continuing the challenge to improve road safety in Queensland, the Queensland Government commenced a review of the SchoolSafe Guidelines in August 1998. This paper discusses the reasons for the review, the development of new guidelines and the introduction of new initiatives in improving safety for the State's youngest road users.

The emphasis of this paper is on the review of the School Zone Guidelines. School zones are only one part of an extensive suite of measures used to improve road safety for children in Queensland. These new guidelines are the latest development of the Safe School Travel (SafeST) Package.

The SafeST Package is comprised of a number of initiatives which aim to improve the safety of travel to and from school for primary and high school students in Queensland. SafeST activities include the Safe School Bus Routes Program, Safe Walking and Pedalling Program, Speed Awareness Program, Flashing Lights in School Zone Trial, SafeST Subsidy Scheme, School Crossing Supervisors Scheme, public education and other initiatives.

The paper also outlines new applications to increase motorist awareness of school areas, including consistent colour on school warning signs, and flashing lights on school zone signs.

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Introduction

Road safety for children continues to be a critical issue on the road safety agenda of the Queensland Government. Queensland Transport's SchoolSafe Guidelines were introduced in 1991, and included instructions for setting up a SchoolSafe committee to review road safety, as well as guidelines for traffic control facilities at schools. In August 1998, Queensland Transport initiated a comprehensive review of the SchoolSafe Guidelines, and in particular, the component addressing the warrants for the installation of school zones.

The new School Environment Safety Guidelines have been developed to update and replace the SchoolSafe Guidelines, and incorporate new warrants for school zones as well as other initiatives such consistent colour and flashing lights at school zones.

This paper will outline two sets of school transport related guidelines which have been recently developed - the new School Environment Safety Guidelines, and the Guidelines for the Road Safety Management of Rural School Bus Routes and Bus Stops. It is considered that the process and issues raised in the review of the school zone guidelines are too lengthy to present in this paper. Therefore, only a brief outline of the issues is presented, with the focus on the results of two SafeST initiatives which have been trialed and included in the new Guidelines. These initiatives are the Consistent Colour Trial, and the Trial of Flashing Lights at School Zones.

Part A of the School Environment Safety Guidelines describes the Safe School Travel (SafeST) Package which comprises a wide range of programs aiming to improve the safety of children travelling to and from school. Part B of the Guidelines outlines a range of solutions to address the types of safety issues identified during safety reviews.

PART A – School Environment Safety Guidelines

Safe School Travel (SafeST) Package

The SafeST Package (1) has been designed to encourage school communities including parents, teachers, students and local residents to become aware of, and to take ownership of safety issues associated with school travel.

The SafeST Package is a collection of programs, schemes and initiatives that are designed to improve road safety for Queensland school students. The SafeST package was developed after wide consultation and in partnership with the State Government's School Transport Safety Consultative Committee.

SafeST activities include the Safe School Bus Routes Program, Safe Walking and Pedalling Program, Speed Awareness Program, SafeST Subsidy Scheme, School Crossing Supervisors Scheme, and the development and delivery of new road safety initiatives, school-based education resources and public education. These programs are generally accessed via SafeST Committees at schools, which are encouraged by Queensland Transport's Road Safety Consultants to review school travel safety using the SafeST checklist.

Safe School Bus Routes Program

The Safe School Bus Route Program was developed in 1996, in consultation with the bus industry and other school transport stakeholders. The program provides for safety reviews of the school bus routes which have been identified as having safety concerns. The program is Statewide, and each review involves Queensland Transport, the local road authority, the bus operator and the Conveyance Committee (made up of parents of children travelling on the bus).

Safe Walking and Pedalling Program (SWAP)

The Safe Walking and Pedalling Program is aimed at primary school students who walk and/or cycle to and from school. The program involves the identification of areas of concern on the routes children travel to and from school, and aims to improve the safety of these areas, rather than simply making children adopt a particular "safe" route. In addition, the program aims to increase the number of children walking and cycling to school through providing infrastructure to improve safety, and encouragement activities.

Speed Awareness Program

The Speed Awareness Program is designed to raise motorist awareness of school areas, and to encourage them to slow down in these areas. Under the program, speeding motorists are detected and informed of their speed, and that they are in a school area. The program is run within school zone hours and uses either a radar activated trailer mounted variable message board or a hand held radar attached to a speed display board, to detect and inform drivers that they are speeding.

The program is run by volunteers from the school community, with assistance from the local Road Safety Consultant.

SafeST Subsidy Scheme

The SafeST Subsidy Scheme aims to improve road safety in the vicinity of existing schools. It is funded from the State Roads Program and provides a 50% subsidy to Queensland local governments for approved school transport related infrastructure works.

The subsidy funding arrangement allows more projects to be completed, and helps to reinforce the importance of community involvement. Projects include safety improvements such as crossing facilities, pickup and setdown areas, pedestrian refuge islands and other traffic management devices.

School Crossing Supervisor Scheme

The School Crossing Supervisor Scheme assists primary aged school children to cross roads outside schools. This scheme has been operating since 1984 in Queensland.

Educational and Information Resources

A number of educational and information resources have been developed to address school transport safety concerns. These include education kits which emphasize an integrated approach to teaching road safety, including professional development packages, reference sheets, and work units. Other programs include the BP Bike Ed Program, and the Student Driver Education Scheme.

PART B – School Environment Safety Guidelines

Application Guidelines

Part B of the School Environment Safety Guidelines outlines a range of solutions to address the types of safety issues identified during safety reviews. When developing programs for road safety around schools, it is important to consider the whole school environment and where possible incorporate the four Es – Education, Engineering, Enforcement and Encouragement into road safety strategies. This part of the guidelines gives advice on the use of various devices and interventions for school environment, for example school zone guidelines, school pedestrian facilities, school parking facilities and school warning facilities.

School Zone Guidelines

A review of the School Zone Guidelines was initiated in August 1998. This was the result of ongoing concerns expressed by the community, including suggestions that the existing guidelines for school zones are too restrictive, concerns regarding the lack of uniformity in school zone operating times, and questions regarding the effectiveness of existing measures.

The review process involved a comprehensive literature review, an examination of school zone practices both interstate and overseas, identification of good practice for school area safety, and extensive consultation with stakeholders.

By way of example, the issue of school zones on heavily trafficked roads is a typical concern raised with regard to the current school zone guidelines (2). Currently, school zones in Queensland are not permitted on:

- Heavily trafficked roads where for a single one hour period of typical school day, the number of vehicles passing along the carriageway where school children cross:-
 1. 1,000 in Brisbane and suburbs
 2. 600 anywhere else in Queenslandduring the times school children are likely to cross the road; and
- multi-lane roads.

Following the review, the volume warrants for school zones were removed as it was seen to be too restrictive. This will allow school zones to be introduced on a number of roads that were previously excluded.

The current guidelines also do not explicitly provide for the times during which a school zone should be operative, and therefore the times in which they operate vary across the State. The new guidelines propose that school zone times of operations should be restricted to a maximum of one hour in the morning and afternoon, with typical time periods being 8.00-9.00am and 2.30-3.30pm. The shorter periods of operation are more closely targeted to school arrival and departure times, thus improving community awareness and voluntary compliance with the school zone speed limit.

Some restrictions to the installation of school zones still remain. School zones are still not permitted on multi-lane roads. The rationale behind this decision is one of driver expectation, in that the majority of drivers would consider school zones to be unreasonable on these roads. Multi-lane roads are generally perceived as providing a higher level of service, and offering fewer interruptions to travel. Therefore low levels of voluntary compliance could be expected at school zones on these roads.

School zones are also not permitted on two-lane two-way roads with mid-block pedestrian actuated signals or restrictions on kerb-side parking. This is because pedestrian actuated signals provide a safe crossing facility and the absence of kerb side parking would indicate that there is no on-street activity associated with the school.

Both the current and the revised guidelines do not allow for school zones at pre-schools, kindergartens or day care centres (unless adjacent to a school), as it is considered that children in these age groups should always be under adult supervision when in the road environment.

School zones are important in providing a safe environment for children, but they must be applied and operated in a consistent and fair manner to work effectively. The proposed guidelines are designed to bring uniformity to the application and operation of school zones. As with all policies, consultation with a wide range of stakeholders was undertaken to ensure their views were considered and included.

Guide for the Road Safety Management of Rural School Bus Routes and Bus Stops

School bus transport is the safest form of transport for children travelling to and from school. Despite this, school transport safety is an emotive issue and there is considerable community concern for the safety of school children travelling by bus (3).

Issues concerning school bus transport safety include:

- (a) The selection and the standard of school bus routes;
- (b) The provision of school bus stops;
- (c) Signing of school bus routes and stops; and
- (d) In-vehicle safety e.g. standees, seat belts and padding

Owing to the transient nature of school bus stops in rural areas due to the movement of school children population, the provision of school bus stops is sometimes considered to be difficult to justify when the costs are high. However, in order to improve safety performance of the more hazardous bus routes, Queensland Transport delivers the Safe School Bus Routes program, under which the top few percent of the State's most hazardous *school bus routes* are reviewed with a view to treating some of the more severe safety deficiencies.

To enable school bus routes and stops to be assessed in a consistent manner, guidelines for good practice which address the issues identified above were necessary. A Guide for the Road Safety Management of Rural School Bus Routes and Bus Stops has been prepared to provide assistance to practitioners on the "good practice" principles of road safety on rural school bus routes. It provides safety principles and criteria in the selection or review of rural school bus routes and school bus stops.

The Guide also covers the traffic safety aspects of school bus routes and school bus stops, and provides assistance in the provision of appropriate signing to warn motorists of the possible presence of school buses and school children. The treatment and provision of school bus routes and bus stops contributes to safe and convenient travel for children going to and from school.

School Zone Initiatives

Under the SafeST Package a number of initiatives aimed at addressing the safety of children travelling to and from school have been developed and trialed. The following two sections briefly outline the trials of new initiatives that have been included in the School Environment Safety Guidelines.

Consistent Colour Trial

Rationale and Description

In Queensland, school areas are identified using a number of different road signs. These include the diamond “SCHOOL” or pictogram “CHILDREN” warning signs, school zone signs, and where there is a pedestrian crossing, the diamond “walking feet ahead” and circular pictogram “walking feet” signs. Due to the variation in these signing practices, a need was identified for a consistent way to identify school areas, in order to increase motorist awareness of the need to take care when driving in these areas.

A consistent colour scheme for school warning signs was proposed. Research identified that the most visible colour for road signs are fluorescent yellow/green and fluorescent orange red.

The signs trialed were made up of the standard diamond school warning signs (W6-4 & W6-3), with a striped fluorescent yellow and fluorescent orange/red target board. Also included in the trial were supplementary plates reading “SCHOOL SAFETY AREA”, a series of striped delineators fitted to the school fence and posts in the vicinity of the road, and where appropriate, high visibility strips fitted to local school buses. All of these were also in the fluorescent yellow and fluorescent orange/red consistent colour scheme.

Method

Pilot trial

Kilcoy was identified as a pilot site for the trial. The signs were installed at all three schools in Kilcoy, and high visibility strips were also fitted to the local school buses. A comprehensive public education campaign was undertaken including the distribution of stickers, rulers and badges to all school students, articles in the local newspaper and school newsletters, and a fridge magnet calendar distributed in the local newspaper.

After implementation, public awareness of the signs was measured through surveys, focus group discussions and interviews with Kilcoy residents, students and teachers at the schools. Vehicle speeds were also measured at both the school sites, and non-school sites as a control measure. This process was repeated at a control town (Boonah).

Results indicated a high level of support for the initiative, and significant awareness of the signs. Residents reported that drivers were slowing down and taking more care in school areas, and that the signs also made them more aware of the need to watch out for school children in the signed areas.

Full trial

After the success of the pilot trial, a full trial of the signs was undertaken at Mt Isa. The signs were installed at 13 schools. Pre-measures of vehicle speeds were taken at school and non-school sites, both at Mt Isa, and the control town (Charters Towers), to provide a baseline measure of traffic speed.

A similar public education campaign was undertaken, with additional activities including a competition in the local newspaper, a direct mailout of the fridge magnet calendar, and a “poster” distributed to Queensland Transport Customer Service Centres, schools, and motoring and community organizations.

To determine awareness of the signs, the trial was evaluated using telephone and intercept surveys of Mt Isa residents, focus group discussions with school crossing supervisors and children, and interviews with teachers. Residents of the control town also participated in telephone surveys. Post-measures of vehicle speeds were undertaken at both Mt Isa and the control town.

Results

The evaluation of awareness of the consistent colour warning signs conducted one month after installation revealed that more than half of Mt Isa residents associated fluorescent yellow with road safety (59%), and recalled fluorescent warning signs introducing school areas (52%). Ninety-eight percent of licenced drivers surveyed recognised the fluorescent yellow and orange/red consistent colour signs, and 96% reported that they would be likely to drive more carefully in areas marked with the signs.

The results of the speed evaluation were inconsistent, with a rise in vehicle speeds at some sites. This may be explained by a high level of police enforcement that was occurring in school zones at the time that the pre-measures were undertaken. In addition, baseline speed measures showed that traffic was generally travelling at or below the speed limit, and therefore any further reduction in speed was unlikely.

Since the trial, discussions with Transport Technology Division in Main Roads have seen the design of the Consistent Colour signs amended to increase the conspicuity of the sign message. While the Consistent Colour scheme has been retained, the signs are now made up of a fluorescent yellow warning sign, mounted on a fluorescent orange/red target board. Due to the additional cost of implementation, the supplementary “SCHOOL AREA SAFETY” plate and additional delineators have not been included in the final Consistent Colour designs.

Flashing Lights in School Zones Trial

Rationale and description

School zones were introduced in Queensland in 1991 to increase the safety of children crossing the roads outside schools. While this has resulted in ongoing crash reductions (4), there continues to be community concern about the effectiveness of school zones, and in particular, drivers ignoring the reduced speed limit and continuing to speed through the school areas.

Flashing lights have been trialed overseas in order to raise driver awareness of school zone speed reductions (5 & 6), however it is an expensive intervention, and is likely to have a reduced effect if over-used. However, it was considered that there may be some circumstances where the use of flashing lights would be appropriate, and in particular, those school zones with reduced visibility and a school crossing.

Queensland Transport identified several sites meeting these criteria, and a trial of flashing lights with school zone signs was proposed. The proposed installation was made up of two flashing yellow lights mounted on a school zone sign at each end of the zone, operating only during school zone times.

Method

Since 1997 flashing lights have been trialed at four school zones, at St Dymphna’s Catholic Primary School on Robinson Road at Aspley, Glasshouse Mountains State School on the Sunshine Coast, Bells Pocket Road at Strathpine, for Strathpine State and Pine Rivers State High schools, and Mt Isa – Duchess Road at Mt Isa, for Happy Valley Primary and St Joseph’s schools.

The lights at Aspley, Glasshouse Mountains and Mt Isa are mains powered and are programmed with the school calendar such that they only operate during school zone times on school days. The lights at Strathpine are solar powered and are switched on by the School Crossing Supervisor with a remote control during each school zone period.

Pre-measures of vehicle speeds were undertaken at each site, as well as measures at one week, one month, and six months after implementation. Speeds were measured during school zone times, and also during midday travel times as a control measure.

To determine awareness of the flashing lights a telephone survey of Mt Isa residents was undertaken approximately one month after installation

Results

Table 1 presents the 85th percentile traffic speeds during school zone times at each of the trial sites, for each data collection period. Speed reductions of up to 12 km/h have been achieved at the trial sites, and although speeds have generally increased over time, they remain significantly lower than the pre-installation speeds ($p < .05$).

Table 1: 85th percentile speeds at school zones with flashing lights during school zone times

	Pre-trial	One week post	One month post	Six months post
St Dymphna’s, Aspley	64	59	54	52
Glasshouse Mountains	60	53	52	55
Bells Pocket Road, Strathpine	61	53	55	55
Mt Isa Duchess Road	57	47	50	52

A telephone survey of 100 local residents in Mt Isa revealed that 78% had either seen or heard of the flashing lights at the Happy Valley/St Joseph's school zone. When asked what they believed was the purpose of the lights, close to one half (45%) suggested that the lights were installed to raise awareness of the school zone times, and a further 28% suggested the purpose was to encourage drivers to slow down in the school zone.

Conclusions

School zones are important in providing a safe environment for children, but they must be applied and operated in a consistent and fair manner to work effectively. The new School Environment Safety Guidelines recommend changes to how school zones should be applied and also introduce a consistent time period for school zone operation across the State.

The new Guidelines outline the SafeST (Safe School Travel) package, as well as provide guidelines for school zones and school travel related infrastructure, including new initiatives such as the consistent colour school warning signs and flashing lights at school zones. It is believed that the success of the School Environment Safety Guidelines will largely be based on application of the "Fours Es" – Education, Encouragement, Engineering and Enforcement

On 1 June 2000, the Minister for Transport and Main Roads released the School Environment Safety Guidelines for public consultation encouraging the community to take part in developing a better road environment for school children.

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Reference

1. Queensland Transport, *Safe School Travel brochure*, Fortitude Valley, Queensland Transport, October 1998.
2. Queensland Department of Main Roads, *Manual of Uniform Traffic Control Devices – Part 10*, Main Roads, 1995.
3. Queensland Transport & Queensland Department of Main Roads, *Guide for the Road Safety Management of Rural School Bus Routes and Bus Stops*, Main Roads, March 2000.
4. Queensland Transport. *Road Traffic Crashes in Queensland 1997*. Fortitude Valley: Queensland Transport, 1998 October.
5. Burritt, B.E., Buchanan, R.C., & Kalivoda, E.T. (1990) School zone flashers: Do they really slow traffic? *ITE Journal*, January, 29-31.
6. Sparks, J.W., & Cynecki, M.J. (1990). Pedestrian warning flasher in an urban environment: Do they really work? *ITE Journal*, January, 32-36.